

CLAIMS

1. (original) In a computer system, a method for simulating a dynamic system with a plurality of interacting nodes of interest in a network of said nodes of interest, said method comprising:

providing said nodes of interest in said computer system, each node of interest having at least one input, at least one output paired with said at least one input, at least one transformation of inputs, at least one transformation of outputs, a measurable ratio of input transformation rate to output transformation rate of an input/output pair, at least a first activated state in the node corresponding to an excess measurable ratio of input to output, at least a second activated state in the node corresponding to a deficit measurable ratio of input to output, and transient storage of a product of the input; and

for each node of interest, defining a balanced state between said first activated state and said second activated state, said balanced state corresponding to a zero error between said measurable ratio and a preestablished balanced ratio, said preestablished balanced ratio corresponding to a mathematical critical point in thermodynamic energy.

2. (original) In the method according to claim 1 further including the steps of:

for each said node of interest, sensing for non-zero error between said measurable ratio and said preestablished balanced ratio; and

using said non-zero error as a control signal to mediate at least one of said inputs, said outputs and an external process.

3. (original) The method according to claim 2 wherein said node is representative of a living organism and wherein said error signal provides input to a regulating element for regulation to a condition of homeostasis.

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4. (Amended) The method according to claim 2 wherein said node is representative of a non-living system and wherein said error signal is at least an indication of imbalance in energy distribution;

Pathways span multiple elements in a system across multiple dimensions.

5. (original) The method according to claim 2, further including:
establishing pathways between outputs of first selected nodes of interest to inputs of second selected nodes of interest.

6. (original) The method according to claim 2 further including depicting each said four dimensional model in five orthogonal dimensions of space, time and grayscale, said grayscale representing a mapping from a second temporal dimension.

7. (original) The method according to claim 6 further including providing feedback across said five orthogonal dimensions from said old four dimensional model to produce a new four dimensional model, said old four dimensional model and said new four dimensional model together constituting a six dimensional model.

8. (original) The method according to claim 1 wherein said critical point is selected for maximum stability of said balanced state.

9. (original) The method according to claim 1 wherein said critical point is selected in response to sensing said outputs of said nodes.

10. (original) In a computer system, a modeling node for use in simulating a dynamic system in a network of said nodes, said node comprising:
at least one input;
at least one output paired with said at least one input;
at least one transformation of inputs;

at least one transformation of outputs;
a measurable ratio of input transformation rate to output transformation rate of an input/output pair;
at least a first activated state in the node corresponding to an excess measurable ratio of input to output;
at least a second activated state in the node corresponding to a deficit measurable ratio of input to output;
transient storage of a product of the input; and
a balanced state between said first activated state and said second activated state, said balanced state corresponding to a zero error between said measurable ratio and a preestablished balanced ratio, said preestablished balanced ratio corresponding to a mathematical critical point in thermodynamic energy.

11. (New) In a computer system, a method for simplifying analysis, synthesis, and control of a complex system, said complex system having both static and dynamic network topology and having a plurality of interacting components that can be represented in phase space, said method comprising:

- a. categorizing the interacting components using an object-process description having at least two scales, said object process description being operative to abstract a scale invariant description of dynamic flows at a current hierarchy of said object process description; thereafter
- b. determining a ratio of parameters controlling a phase transition between phases, said phases being defined by boundaries in a general input-output graph for a coarsest grained level of hierarchy; thereafter
- c. repeating steps a and b for sublevels in said hierarchy; thereafter
- d. defining critical points for all levels and sublevels in said hierarchy;

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- e. determining a parameter range that produces a steady state at a minimum thermodynamic flux for each said ratio obtained in step b;
 - f. defining a universal module for optimal transport and control of dynamic critical points at each level;
 - g. determining phase space location of each said universal module relative to its error free state; and
 - h. outputting a hierarchical phase diagram comprising a set of said critical system parameter locations in said phase space.
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